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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/265,601	03/10/1999	WAN-UK CHOI	03364.P010	4721

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EXAMINER

DOVE, TRACY MAE

ART UNIT

PAPER NUMBER

1745

20

DATE MAILED: 06/02/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/265,601

Applicant(s)

CHOI ET AL.

Examiner

Tracy Dove

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 April 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

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DETAILED ACTION

This Office Action is in response to the communication filed on 4/14/03. Applicant's arguments have been considered, but are not persuasive. Claims 1-8 remain rejected in view of the prior art. This Action is made **FINAL, as necessitated by amendment**.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-4 are rejected under 35 U.S.C. 102(e)/103(a) as being anticipated by, and alternatively unpatentable over, Choi et al., US 6,245,460.

Choi discloses a negative electrode active material for a lithium-based secondary battery that includes a graphite carbon material having an intensity ratio $I(110)/I(002)$ of an X-ray diffraction peak intensity $I(002)$ at a (002) plane to an X-ray diffraction peak intensity $I(110)$ at a (110) plane of less than 0.2. See abstract. The method of preparing the carbon material includes a heat-treating step (col. 2, lines 45-56). The fine structure of the synthesized carbon material is

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changed in accordance with the preparing conditions and reveals differences compared to a natural graphite (col. 4, lines 11-13). The graphite structure was prepared from coal tar pitch (Example 1) or petroleum pitch (Example 2). Thus, the graphite of Choi is an artificial graphite material. Choi teaches the method of preparing the negative electrode active material includes dissolving a coal tar pitch or a petroleum pitch in an organic solvent to remove insoluble components therefrom, heat-treating the pitch at a temperature in the range of 400-450°C for 30 minutes or more under an inert atmosphere to thereby produce small spherical particles having an optical anisotropy (mesophase particles), stabilizing or coking the mesophase particles, carbonizing the stabilized or coked mesophase particles at a temperature in the range of 1000-1300°C, and graphitizing the carbonized mesophase particles (col. 3, lines 15-27). Figure 1 teaches an intensity ratio $I(110)/I(002)$ of less than 0.01 (see point a). The positive electrode active material comprising a lithium-containing transition metal oxide (col. 1, lines 44-48). The electrolyte includes a lithium salt in an organic electrolyte (col. 6, lines 8-9).

Thus the claims are anticipated.

The claims are alternatively unpatentable because the courts have ruled that product-by-process claims, in the absence of unexpected results, are obvious. Thus, whether the graphite material of the negative electrode is prepared by a method comprising a pulverization step or by a method without a pulverization step, the graphite materials, as an end result, are the same. Specifically, the instant claims and the Choi reference both recite/teach a graphite carbon material having an intensity ratio $I(110)/I(002)$ of an X-ray diffraction peak intensity $I(002)$ at a (002) plane to an X-ray diffraction peak intensity $I(110)$ at a (110) plane of less than 0.2.

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Note if evidence of unexpected results is provided regarding the pulverization step, the Choi reference would not be available as prior art if it can be shown that the patent and the instant application are commonly assigned.

Claims 5-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sonobe et al., US 5,721,071 "Sonobe".

Sonobe teaches a graphitic material suitable as an electrode material for a non-aqueous solvent-type secondary battery. See col. 1, lines 7-13. A lithium battery is specifically disclosed in col. 7, lines 24-38. Example 4 teaches a petroleum pitch having a quinoline-insoluble content of 1 wt% (organic insoluble impurities) was heat treated at 600°C for 1 hour (coking) in a nitrogen gas stream. Then the pitch was pulverized to obtain carbon precursor particles. The carbon precursor particles were carbonized and graphitized to obtain a graphitic material. Sonobe teaches that the carbon precursor may be heat-treated at 350-700°C in an inert gas atmosphere (heat-treating) to effect further polycondensation and remove light fractions, thereby providing a carbon precursor having an optically anisotropic texture (col. 5, lines 5-16).

Sonobe does not explicitly teach heat treating for "4 hours or more . . . to thereby produce at least 50 weight percent of mesophase particles based on the pitch". Sonobe does not explicitly state that the pitch is dissolved in an organic solvent to remove insoluble components.

However, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because Sonobe teaches that mesophase bead material is produced by heat-treating petroleum pitch or coal pitch for 1-2 hours at 400-450°C (col. 2, lines 24-27). Thus one of skill would have known that the heat-treatment of the carbon

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precursor taught in col. 5, lines 5-16 of Sonobe would result in the formation of mesophase bead material. While Sonobe does not explicitly teach heat-treating for 4 hours or more, one of skill would have found heat treating for 4 hours or more obvious because the duration of the heat-treating step would have an effect on the formation of mesophase bead material. Through routine experimentation, one of skill could have determined the heating durations necessary to produce a specific percent of mesophase bead material. Sonobe teaches heat-treating petroleum pitch at 400-450°C results in the formation of mesophase bead material.

Regarding the limitation that the pitch is dissolved in an organic solvent to remove insoluble components, the invention as a whole would have been obvious to one having ordinary skill because Sonobe suggests that the organic insoluble components have been removed from the petroleum pitch. Example 4 teaches that the petroleum pitch has an quinoline (organic)-insoluble content of 1 wt%. This suggests that the petroleum pitch has been dissolved in quinoline to remove organic-insoluble components.

It is important to note that the claims do not recite that only the organic-soluble components are further processed to produce the graphite of the negative electrode. Furthermore, the claims do not recite all organic-insoluble components are removed from the pitch.

Response to Arguments

Applicant's arguments filed 4/14/03 have been fully considered but they are not persuasive.

Kubota et al.

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The 35 U.S.C. 102(e)/103(a) rejection in view of Kubota has been withdrawn. Kubota is directed to a natural graphite material, while the instant claims are directed toward an artificial graphite material.

Hayashi et al.

The 35 U.S.C. 102(e)/103(a) rejection in view of Hayashi has been withdrawn.

Sonobe et al.

Regarding Sonobe, Applicant argues that it is improper to conclude from the pitch content alone that Example 4 of Sonobe teaches the “dissolving” step of the instant claims. Applicant states “it appears as though the petroleum pitch of Example 4 is natural pitch without any pre-treatment”. However, Sonobe suggests that the organic insoluble components have been removed from the petroleum pitch. Specifically, how would one of skill in the art be able to determine the quinoline insoluble content of the pitch if the pitch has not been dissolved in quinoline? Example 4 teaches that the petroleum pitch has an quinoline (organic)-insoluble content of 1 wt%. This suggests that the petroleum pitch has been dissolved in quinoline to remove organic-insoluble components. It is important to note that the claims do not recite that only the organic-soluble components are further processed to produce the graphite of the negative electrode. Furthermore, the claims do not recite all organic-insoluble components are removed from the pitch. Applicant states “the quinoline-insoluble components in the pitch of Example 4 are mainly carbon black or macromolecules with high molecular weight, which are known to decrease the fluidity of the pitch and to prevent crystallization during graphitization”.

It is unclear how Applicant reaches this conclusion based on the teachings of the reference. Examiner requests Applicant point out the section of Sonobe that discloses the asserted quinoline-insoluble components.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tracy Dove whose telephone number is (703) 308-8821. The Examiner may normally be reached Monday-Thursday (9:00 AM-7:30 PM). My supervisor is Pat Ryan, who can be reached at (703) 308-2383. The Art Unit receptionist can be reached at (703) 308-0661 and the official fax numbers are 703-872-9310 (after non-final) and 703-872-9311 (after final).

May 22, 2003



STEPHEN IGLAFUT
PRIMARY EXAMINER
GROUP

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